D. NOISE

This section of the Environmental Impact Report (EIR) describes existing noise conditions in the vicinity of the Greater Downtown area, describes criteria for determining the significance of noise impacts, and estimates the likely noise that would result from construction activities, vehicular traffic, aircraft, and other noise sources. Where appropriate, mitigation measures are recommended to reduce project-related noise impacts to a less-than-significant level.

This section of the EIR utilizes existing setting information from several sources. It includes a noise assessment study prepared for the previously proposed West Julian Revitalization project by Brown-Buntin Associates, Inc. (BBAI).[1] The existing setting data, including ambient noise measurement results included in the BBAI report are used here. The full BBAI noise assessment is available at the City's Department of Planning, Building and Code Enforcement. The BBAI report also contains background information that will be useful to readers unfamiliar with the basics of acoustical analysis, including a description of the characteristics of sound, measurement of sound, psychological and physiological effects of noise, and audible noise changes. Field measurements by LSA staff were also used. In addition, noise exposure information in the community is developed for airport operations by the City of San Jose on a quarterly basis, and the most recent of those data and projections are also used. Appendix D contains the noise analysis model runs for this project.

1. Setting

This noise assessment follows the City of San Jose's guidelines for the preparation of noise studies, outlined in the City's Noise Element and Municipal Code Noise Control Ordinance.

a. Overview of the Existing Noise Environment. The project is located in an urban area and is, therefore, influenced by several surrounding noise sources. Primary noise sources that affect the baseline noise level of the area include the following:

- Vehicle traffic on State Route 87 (SR 87, Guadalupe Parkway), Interstate 280 (I-280), and local secondary roadways.
- Railroad noise from the Union Pacific Railroad tracks that pass through the project area.
- Aircraft noise from the San Jose International Airport located approximately one mile to the northwest of the project area.

(1) Existing Noise Measurement Levels. To determine the existing noise environment in the project area and in the vicinity, noise measurements were taken by BBAI at three representative locations within the project area over a 48-hour period to determine the existing noise environment. The measurement locations are shown in Figure V.D-1.

The noise measurements were made for a period of 48 continuous hours at each location. The results of the measurements are included in the BBAI noise assessment in Appendix D. The descriptors shown in the tables are the L_1, L_{10}, L_{50}, and L_{90} levels (i.e., those levels exceeded 1 percent, 10 percent, 50 percent, and 90 percent of the time). Also shown are the maximum (L_{max}) and minimum (L_{min}) levels and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the

[1] Brown-Buntin Associates, Inc., 2001. *Environmental Noise Assessment, West Julian Revitalization Project,* February 28.

Figure V.D-1: Noise Monitoring Sites and Aircraft Noise Contours

8x11 B&W

day/night average level (DNL or L_{dn}) or the community noise equivalent level (CNEL). The CNEL noise scale is similar to the L_{dn} noise scale (within 1 dBA of each other) and are usually interchangeable. The purpose of the 48-hour continuous measurements was to obtain an overall profile of existing noise levels in the area from all noise sources.

To evaluate the existing noise levels relative to the City of San Jose Noise Element standards, the CNEL/L_{dn} for the survey locations were calculated by decibel averaging of the hourly L_{eq} as they apply to the daily time periods of the CNEL/L_{dn} index.

The CNEL/L_{dn} at the three noise level monitoring locations ranged from 63 to 68 dBA. The highest noise levels were on the properties located in the northwest portion of the area, or those closer to the flight paths of arriving aircraft approaching the Airport and to vehicle traffic on SR 87.

In addition to the long-term noise measurements three short-term (30 minute) noise level measurements were performed in the project area by LSA Associates, Inc. in August 2001 (see Figure V.D-1 for locations). The existing noise levels in the project area range from 63 to 72 dBA L_{eq}.

(2) Existing Aircraft Noise Levels. San Jose International Airport is located northwest of the project area. Noise exposure information in the community is developed for airport operations by the City of San Jose on a quarterly basis, based on current airport operations data and continuously measured noise levels. Aircraft noise exposure on the project area is approximately between the 60 and 70 dBA CNEL contours. Approximately 25 percent of the project area is within the 65 dBA CNEL contour.

On December 19 and 20, 2000, noise level measurements of aircraft flight were conducted on the project area by BBAI staff. Maximum single-event noise levels recorded on the project area from most of the aircraft ranged from 77 to 82 dBA. One measurement was as high as 85.9 dBA.

(3) Existing Rail Noise Levels. The Union Pacific rail line borders the western boundary of the project area. Approximately three to four trains use the line per day. Activity on the Union Pacific rail lines represents a source of noise and groundborne vibration in the City. Freight trains generally emit higher noise levels than passenger or commuter trains. Therefore, in areas where the tracks are used more frequently by freight trains, the single event noise exposure levels and total train noise would be higher than in areas with less frequent freight train use. Although trains were observed during the noise monitoring, according to BBAI staff, it was not possible to accurately measure the train noise because of interference from aircraft noise. According to BBAI, slow-moving freight trains typically produce an average single-event noise level of 80 to 85 dBA at 100 feet. Assuming four trains per day (two daytime and two nighttime trains), the average CNEL/L_{dn} at 100 feet is likely to range from 44 to 40 dBA.

(4) Existing Traffic Noise Levels. Existing traffic noise levels were calculated using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model. Traffic data used in the model were obtained from the traffic impact analysis prepared by Hexagon Transportation Consultants, Inc. (June 2003). Table V.D-1 lists the calculated traffic noise levels in the project study area under the existing (2003) baseline conditions. Traffic noise in the project vicinity is generally low to moderate, except along SR 87, I-280, and Market Street, where the 70 CNEL contours extend beyond the roadway right-of-way.

Table V.D-1: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet From Outermost Lane
Market St.					
North of Julian St.	20,040	62	122	256	68.0
Between Julian St. and Saint James St.	18,550	57	115	242	68.1
Between Saint. James St. and Santa Clara St.	16,240	< 50[a]	105	222	67.5
South of Santa Clara St.	15,730	< 50	103	218	67.4
1st St.					
Between Taylor St. and Julian St.	10,870	< 50	52	112	64.6
Between Julian St. and Saint James St.	3,930	< 50	< 50	57	60.5
Between Saint James St. and Santa Clara St.	2,830	< 50	< 50	< 50	59.1
South of Santa Clara St.	2,950	< 50	< 50	< 50	59.2
4th St.					
Between Hedding St. and Julian St.	14,070	< 50	78	166	66.5
Between Julian St. and Saint James St.	13,745	< 50	77	163	66.4
Between Saint James St. and Santa Clara St.	12,870	< 50	73	156	66.1
South of Santa Clara St.	11,300	< 50	67	143	65.6
Julian St.					
West of Market St.	11,420	< 50	54	116	64.8
Between Market St. and 1st St.	10,540	< 50	51	110	64.4
Between 1st St. and 4th St.	7,235	< 50	< 50	86	62.8
Between 4th St. and 11th St.	5,500	< 50	< 50	71	61.6
Saint James St.					
West of Market St.	8,370	< 50	< 50	94	63.4
Between Market St. and 1st St.	8,000	< 50	< 50	92	63.2
Between 1st St. and 4th St.	8,000	< 50	< 50	92	63.2
Between 4th St. and 11th St.	8,430	< 50	< 50	95	63.5
Santa Clara St.					
West of Market St.	15,080	< 50	101	212	67.2
Between Market St. and 1st St.	15,100	< 50	101	212	67.2
Between 1st St. and 4th St.	15,570	< 50	103	216	67.3
Between 4th St. and 11th St.	16,435	< 50	106	224	67.5
SR 87	75,000	247	531	1,143	78.2
I-280	176,500	437	938	2,018	80.6

[a] Traffic noise within 50 feet of roadway centerline requires site specific analysis.

Source: LSA Associates, Inc., June 2003.

2. Impacts and Mitigation Measures

a. Criteria of Significance. A project would normally have a significant effect on the environment related to noise if it would substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project area are the criteria in the City's Noise Element of the General Plan. For the purposes of this project, a noise impact is considered significant if the project results in:

- Exposure of persons to or generation of noise levels in excess of standards established in the San Jose Zoning Ordinance Performance Standards for Noise, San Jose General Plan, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial temporary, periodic, and/or permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, project would expose people residing or working in the project area to excessive noise levels.

The standards within the City of San Jose Noise Element determine the acceptable noise environment for proposed residential uses. The long-range objective is an exterior L_{dn} of 55 dBA. The short-range exterior quality level is 60 dBA L_{dn}, with 76 dBA L_{dn} considered to be the maximum exterior noise level necessary to avoid significant adverse health effects. An interior noise quality level of 45 dBA L_{dn} has been established. The Noise Element recognizes that full attainment of noise standards may not be achievable in the environs of San Jose International Airport and the Downtown Core Area.

b. Less-Than-Significant Noise Impacts. There are no less-than-significant noise impacts associated with the proposed project. Several potentially significant impacts are analyzed below.

c. Significant Noise Impacts. Across the project area properties and people are exposed to noise levels generated by traffic on SR 87 and I-280, aircraft noise, and railroad operations along the railroad tracks, which are above the City of San Jose's noise guidelines for residential, open space, and office uses. Depending on where buildings are situated and how they are constructed, the interior of some buildings and associated outdoor spaces may exceed appropriate noise standards.

(1) Long-Term Aircraft Noise. Aircraft from San Jose International Airport generate an annualized CNEL of approximately 60 to 70 dBA CNEL in the area. This noise exposure was estimated from the San Jose International Airport 2010 Master Plan Noise Contour Maps. Build out of the project would expose future office and residential occupants and park users to noise levels that would exceed the City's short-range noise quality standard of 60 dBA L_{dn} and for some buildings may exceed the interior noise standard of 45 dBA L_{dn} depending on the building design. Therefore, the impact of aircraft noise levels to future residential and park uses would be considered significant.

Standard residential structures in northern California provide an exterior-to-interior noise reduction of 25 dBA with windows closed and 15 dBA with windows open. With windows closed, the proposed

residential units would meet the 45 dBA CNEL interior noise standard (70 dBA - 25 dBA = 45 dBA). With windows open, however, there is a potential that these residential units would experience interior noise higher than the 45 dBA CNEL standard (70 dBA - 15 dBA = 55 dBA). An air-conditioning system, a form of mechanical ventilation, is required for proposed residential units to ensure that windows can remain closed for prolonged periods of time and achieve the interior noise standard.

If outdoor activity areas (e.g., patios, balconies, common recreation areas) are included in the residential design, these features should be situated so that structures will provide as much noise shielding as possible from aircraft activities at San Jose International Airport.

Typical new office buildings with fixed windows provide a minimum of 30 dBA in noise reduction indoors. Therefore, it is likely that standard design measures will reduce interior noise levels to a less than significant impact for the proposed commercial/office uses.

Impact NOI-1: Aircraft noise levels would represent a significant adverse impact on project residents and park users. (S)

Implementation of the following mitigation measures would reduce the impact to a less-than-significant level.

Mitigation Measure NOI-1a: The following policies contained in the City's 2020 General Plan serve to reduce significant noise impacts:

- Noise Policy 1: The City's acceptable noise level objectives are 55 dBA Ldn as the long-range exterior noise quality level, 60 dBA L_{dn} as the short-range exterior noise quality level, 45 dBA L_{dn} as the interior noise quality level, and 76 dBA L_{dn} as the maximum exterior noise level necessary to avoid significant adverse health effects. These objectives are established for the City, recognizing that the attainment of exterior noise quality levels in the environs of the San Jose International Airport, the Downtown Core Area, and along major roadways may not be achieved. To achieve the noise objectives, the City should require appropriate site and building design, building construction, and noise attenuation techniques in new residential development.

Mitigation Measure NOI-1b: At the time future residential projects are proposed, the following measures shall be required:

- Preparation of a site-specific noise analysis by an acoustical consultant to determine specific design measures to reduce interior noise levels to conform to State Title 24 requirements. An outside-to-inside noise level reduction of at least 20 dBA should be used as a basis for achieving an interior noise level of 45 dBA L_{dn}. Design features that may be required could include the following: (1) use of sound-rated windows and exterior doors, (2) chimney caps on fireplaces, (3) stucco or cement plaster exterior construction as opposed to wood siding, and (4) air-conditioning or mechanical ventilation so that windows and door may remain closed.
- In order to reduce aircraft-related noise impacts, outdoor activity areas (e.g., patios, balconies, and common recreation areas) shall be situated so that the structures could provide some noise shielding.

Mitigation Measure NOI-1c: Prior to the issuance of building permits for development, the property owner(s) shall grant an avigation easement to the City of San Jose (in compliance with the ALUC Plan and City General Plan Aviation Policy # 49), providing for acceptance of aircraft noise impacts.[2] (LTS)

(2) Long-Term Traffic Noise. The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions in the vicinity of the project area. Traffic data used in the model were obtained from the traffic impact analysis prepared by Hexagon Transportation Consultants, Inc. (June 2003). The resultant noise levels were weighted and summed over a 24-hour period in order to determine the CNEL values. CNEL contours are derived through a series of computerized iterations to isolate the 60, 65, and 70 dBA CNEL contour for traffic noise levels in the project area. The future traffic noise levels are show in Table V.D-2.

Table V.D-2 shows that all areas of the project area will be exposed to traffic noise levels exceeding the City's short-range noise quality standard of 60 dBA L_{dn}. Land uses located along secondary roads, such as Julian Street and Saint James Street, will be exposed to noise levels exceeding 65 dBA CNEL. Land uses adjacent to SR 87 and I-280 will be exposed to noise levels exceeding 70 dBA CNEL.

To meet the City's short-range 60 dBA L_{dn} exterior noise standard, outdoor active uses (such as patios or backyards associated with the proposed residential uses) would require a six-foot sound barrier along the property line.

Standard residential construction in northern California would provide 25 dBA exterior-to-interior noise reduction with windows closed and 15 dBA noise reduction with windows open. Therefore, residential structures outside of the 70 dBA CNEL contour range would meet the 45 dBA interior noise standard without building facade upgrades. However, to ensure that windows can remain closed for prolonged periods of time, an air-conditioning system is required. All proposed residential buildings that would potentially be impacted by the 60 dBA CNEL noise from vehicular traffic would require the implementation of an air-conditioning system.

Areas that would be impacted by traffic noise exceeding 70 dBA CNEL require additional building facade upgrades, such as double-paned windows with a minimum sound transmission class (STC) rating of STC-30, which is higher than what the standard residential construction provides.

Impact NOI-2: The effect of existing and future traffic noise on uses within the area could be significant. (S)

Implementation of the following mitigation measures would reduce the impact to a less-than-significant level.

[2] It should also be noted that a recent California law (passed and signed as AB 2776 of the 2002-03 regular session and known as the "Aviation Noise Disclosure" bill) now requires property sellers within the ALUC referral area to disclose that the property may be impacted by airport operation.

Table V.D-2: Future (2020) Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet From Outermost Lane
Market St.					
North of Julian St.	38,790	90	186	395	70.9
Between Julian St. and Saint James St.	36,610	85	178	380	71.0
Between Saint. James St. and Santa Clara St.	28,090	73	150	319	69.9
South of Santa Clara St.	21,650	62	126	269	68.7
1st St.					
Between Taylor St. and Julian St.	14,300	< 50[a]	63	135	65.8
Between Julian St. and Saint James St.	7,050	< 50	< 50	84	63.0
Between Saint James St. and Santa Clara St.	5,445	< 50	< 50	71	61.9
South of Santa Clara St.	4,440	< 50	< 50	62	61.0
4th St.					
Between Hedding St. and Julian St.	14,885	< 50	81	172	66.8
Between Julian St. and Saint James St.	22,915	< 50	107	229	68.6
Between Saint James St. and Santa Clara St.	19,295	< 50	96	204	67.9
South of Santa Clara St.	15,200	< 50	82	174	66.9
Julian St.					
West of Market St.	19,280	< 50	76	164	67.0
Between Market St. and 1st St.	16,295	< 50	68	147	66.3
Between 1st St. and 4th St.	11,970	< 50	56	120	65.0
Between 4th St. and 11th St.	9,955	< 50	< 50	106	64.2
Saint James St.					
West of Market St.	14,370	< 50	63	135	65.8
Between Market St. and 1st St.	16,530	< 50	69	148	66.4
Between 1st St. and 4th St.	14,380	< 50	63	135	65.8
Between 4th St. and 11th St.	14,875	< 50	64	138	65.9
Santa Clara St.					
West of Market St.	22,250	63	129	273	68.9
Between Market St. and 1st St.	21,800	63	127	270	68.8
Between 1st St. and 4th St.	22,210	63	129	273	68.9
Between 4th St. and 11th St.	25,665	69	141	301	69.5
SR 87	75,000	247	531	1,143	78.2
I-280	176,500	437	938	2,018	80.6

[a] Traffic noise within 50 feet of roadway centerline requires site specific analysis.

Source: LSA Associates, Inc., June 2003.

Mitigation Measure NOI-2a: The following policies contained in the City's 2020 General Plan serve to reduce significant noise impacts:

- Noise Policy 1: (detailed above under Mitigation Measure NOI-1a).
- Urban Design Policy 1: The City should continue to apply strong architectural and site design controls on all types of development for the protection and development of neighborhood character and for the proper transition between areas with different types of land uses.

Mitigation Measure NOI-2b: At the time future residential projects are proposed, implement Mitigation Measure NOI-1b. (LTS)

(3) Long-Term Stationary Noise Sources. The potential long-term stationary noise impacts at the project area would be primarily from the outdoor activities/operations at individual office/commercial uses on and adjacent to the project area.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate, resulting in a six-decibel reduction in the noise level for each doubling of distance from a single point source of noise to the noise receptor.

The proposed office and commercial uses could result in noise from mechanical equipment and other on-site sources (air-conditioning or other mechanical ventilation equipment, delivery loading docks or areas, emergency generators, etc.), which could create noise that emanates beyond the office use boundaries.

To prevent noise impacts on adjacent land uses loading docks or loading areas and noise-generating equipment associated with the office and retail uses should be located as far as practical from all existing and planned residential properties.

Impact NOI-3: Stationary noise sources in the area could create significant long-term noise impacts. (S)

Implementation of the following mitigation measures would reduce the impact to a less-than-significant level.

Mitigation Measure NOI-3a: The following policies contained in the City's 2020 General Plan serve to reduce significant noise impacts:

- Noise Policy 8: The City should discourage the use of outdoor appliances, air conditioners, and other consumer products that generate noise levels in excess of the City's exterior noise standards
- Noise Policy 11: When located adjacent to existing or planned noise sensitive residential land or public/quasi-public land use, nonresidential land uses should mitigate noise generation to meet the 55 dBA L_{dn} guidelines at the property line.

Mitigation Measure NOI-3b: The following measure is required for the operations of the proposed project:

- Loading docks or loading areas and noise-generating equipment associated with the office and retail uses will be located as far as practical from all existing and planned residential properties. (LTS)

(4) Long-Term Rail Noise and Groundbourne Vibration. Factors that influence the overall impact of railroad noise on adjacent uses include the distance of the uses from the tracks, surrounding land topography, the intermittent nature of train events, and the lack of sound walls or other barriers between the tracks and adjacent uses. Although the rail activity generates noise and groundborne vibration, the rail activity is intermittent. It is also influenced by the sporadic use of warning horns by trains when they approach at-grade crossings. The Union Pacific rail line borders the western boundary of the project area. Approximately four trains per day use the Union Pacific rail line (two daytime and two nighttime trains). According to BBAI, four trains per day along this rail line would result in an average L_{dn} at 100 feet of 44 to 49 dBA. As a result, rail activity would not exceed City time-averaged noise level standards for residential use. Therefore, no significant noise impacts from rail operations would occur. Slow-moving freight trains, however, typically produce single-event noise levels of approximately 80 to 85 dBA at a distance of 100 feet. This noise level could result in interference in speech and disturb residents, if they are sleeping. Therefore, residential uses proposed on the west end of the project area would potentially be exposed to intermittent single-event train noise that may be viewed as an annoyance to the residents.

Implementation of *Strategy 2000* has the potential to result in disturbance to new residences from groundborne vibration associated with development near the Union Pacific railroad tracks. Problems, such as disturbance due to groundborne vibration and noise are usually contained to areas within about 100 feet of the vibration source.[3] Typically, the main effect of groundborne vibration and noise is to cause annoyances for occupants of nearby buildings.

In addition to the Union Pacific rail line an extension of the Bay Area Rapid Transit (BART) is proposed to enter the project area at the Diridon Station and run below Santa Clara Street into Downtown. Due to the frequency, with which BART trains could arrive and depart, the average daily noise generated by the BART trains will be significantly higher than the noise generated by the Union Pacific rail line. Proposed sensitive land uses adjacent to the BART line will be potentially exposed to noise levels exceeding the City's short-range noise quality standard of 60 dBA L_{dn}. The impacts of that project are examined in detail in its own EIR.[4]

To meet the City's short-range 60 dBA L_{dn} exterior noise standard, outdoor active uses, such as patios or backyards, associated with the proposed residential uses require a 6-foot sound barrier along the property line. Residential structures outside of the 70 dBA CNEL contour range would meet the 45 dBA interior noise standard without building facade upgrades. However, to ensure that windows can remain closed for prolonged periods of time, an air-conditioning system is required. All proposed

[3] U.S. Department of Transportation, Federal Transit Administration, 1995. *Transit Noise and Vibration Impact Assessment.* April.

[4] Federal Transit Administration and Santa Clara Valley Transportation Authority, 2004. *Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR), Silicon Valley Rapid Transit Corridor.* March 16.

residential buildings that would potentially be impacted by the 60 dBA CNEL noise from vehicular traffic would require the implementation of an air-conditioning system.

Areas that would be impacted by train noise exceeding 70 dBA CNEL require additional building facade upgrades, such as double-paned windows with a minimum sound transmission class (STC) rating of STC-30, which is higher than what the standard residential construction provides.

Impact NOI-4: Rail noise could create significant long-term noise impacts. (S)

Implementation of the following mitigation measures would reduce impacts related to long-term rail noise and groundbourne vibration to a less-than-significant level.

Mitigation Measure NOI-4a: The following policies contained in the City's 2020 General Plan serve to reduce significant noise impacts:

- Noise Policy 1: (Detailed above under Mitigation Measure NOI-1a).
- Urban Design Policy 21: To promote safety and minimize noise impacts in residential and working environments, development that is proposed adjacent to railroad lines should be designed to provide the maximum separation between the rail line and dwelling units, yards, or common open space areas; offices and other job locations; facilities for the storage of toxic or explosive materials; and the like. To the extent possible, areas of development closest to an adjacent railroad line should be devoted to parking lots, public streets, peripheral landscaping, the storage of nonhazardous materials, and so forth.

Mitigation Measure NOI-4b: At the time future residential projects or non-residential projects that include sensitive receptors are proposed, the following measures shall be required:

- For sites within 200 feet of an operating rail lane, a site- and project-specific noise/vibration analysis shall be prepared.
- Train noise impacts shall be reduced by the construction of a sound wall, building orientation, building noise attenuation, and mechanical ventilation systems to reduce interior noise levels to acceptable levels. (LTS)

(5) Short-Term Construction Noise. Noise levels from construction activities such as finished grading and building erection for the proposed project may range up to 91 dBA L_{max} at 50 feet from the active construction area for a limited time period.

The transport of workers and construction equipment and materials to the project area would incrementally increase noise levels on access roads leading to the area. Workers and construction equipment would use existing routes. Therefore, noise from passing trucks (87 dBA L_{max} at 50 feet) would be similar to existing truck-generated noise. Short-term intermittent noise from trucks would be minor and less than significant when averaged over a longer time period. In addition, noise associated with on-road vehicles is regulated by federal and state governments and is exempted from local government regulations.

Noise generated during excavation, grading, and building erection on the project area would result in potential noise impacts to off-site uses and to on-site uses if they were to occupy a site while later

phases of construction were continuing. Existing tenants in the project vicinity may also experience short-term noise generated by construction equipment and activities in the project area when construction occurs near the project boundary.

Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table V.D-3 lists typical construction equipment noise levels recommended for use in noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor. Typical construction noise levels vary up to a maximum of 91 dBA L_{max} at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of a site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backhoes, bulldozers, draglines, and front loaders and earthmoving and compacting equipment, which includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by 3-4 minutes at lower power settings.

Table V.D-3: Typical Construction Equipment Noise Level

Type of Equipment	Range of Sound Levels Measured (dBA at 50 feet)	Suggested Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	68 to 80	77
Dozers	85 to 90	88
Tractors	77 to 82	80
Front-End Loaders	86 to 90	88
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 86	86
Trucks	81 to 87	86

Source: Bolt, Beranek & Newman 1987. Noise Control for Buildings and Manufacturing Plants.

Construction of the proposed project is expected to require the use of earthmovers such as bulldozers and scrapers, loaders and graders, water trucks, and pickup trucks. Pile drivers and rock drills are not expected to be used on a regular basis during construction. As shown in Table V.D-3, the typical maximum noise level generated by each earthmover on a proposed project site is assumed to be 88 dBA L_{max} at 50 feet from the operating earthmover. The maximum noise level generated by water and pickup trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength would increase the noise level by 3 dBA. Assuming each piece of construction equipment operates at some distance apart from the other equipment, the worst-case combined noise level at the nearest residences during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from an active construction area.

Pile driving may be required, which could generate noise levels above 90 dBA L_{max} and ground vibration. Noise associated with pile driving is a very loud and impulsive sound, resulting from a large hammer that drops on steel or reinforced concrete piles. Individual noise impacts are of short duration (under one second), but the noise is repetitive, occurring about once every two seconds. Pile driving also generates vibration that is perceptible at a distance of 100 feet but would not generally be expected to cause damage to other properties. (The potential exception to this rule would be historic structures, as discussed in this chapter, in Section I, Cultural Resources.)

Impact NOI-5: Construction period activities could create significant short-term noise impacts. (S)

Implementation of the following mitigation measures would reduce the impact to a less-than-significant level.

Mitigation Measure NOI-5a: The following policy contained in the City's 2020 General Plan serve to reduce significant noise impacts:

- Noise Policy 1: (Detailed above under Mitigation Measure NOI-1a).

Mitigation Measure NOI-5b: Implementation of the following multi-part measure would reduce potential construction period noise impacts to less-than-significant levels:

- Construction activities will be limited to daytime hours (7 a.m. to 7 p.m. weekdays) for any construction within 500 feet of a residence.
- All internal combustion engines for construction equipment used on the site will be properly muffled and maintained.
- In the event that pile driving is proposed, nearby residents will be notified of the schedule for its use while it is in use. Portable acoustical barriers will be installed around pile driving equipment.
- A name, address, and phone number of a contact person will be posted on the site to handle noise complaints.
- Unnecessary idling of internal combustion engines will be prohibited.
- All stationary noise generating construction equipment, such as air compressors and portable power generators, will be located as far as practical from existing residences. (LTS)

(6) Short-Term Cultural and Festival Events. Beyond the potential long-term impacts that could be generated by aircraft, vehicle traffic, stationary noise sources, and railroad operations, or the short-term construction of area buildings and other improvements, *Strategy 2000* also envisions the Downtown as a place for public performances and events in public plazas, parks and presumably on streets closed for such purposes. Specific activities that are mentioned in the plan (and in Chapter III, Project Description, of this EIR) are street fairs, dances and concerts, but one can imagine a variety of public events of a musical, cultural, literary, sporting, civic or celebratory nature. Whereas the potential construction noise impacts summarized above would generally be experienced for a few hours per day over several weeks or months, the noise from short-term cultural and festival events would generally occur for several hours on a single day, or perhaps over a long weekend or several days. Noise from such events is much less predictable than from standard construction activities. It is possible that both the overall volume of the noise impact as perceived at the nearest sensitive receptor(s) and the annoyance due to the type of noise created (e.g., frequency or rhythm) could exceed that of the short-term construction noise. For example, amplified popular music or the engine noise from auto racing could be more annoying than many aspects of construction noise. Until such special events are proposed, predictions as to their exact noise impacts would be speculative.